ARMSTRONG

Design Envelope 4380, 4372 & 4280

Mechanical Seal Replacement

Installation and operating instructions

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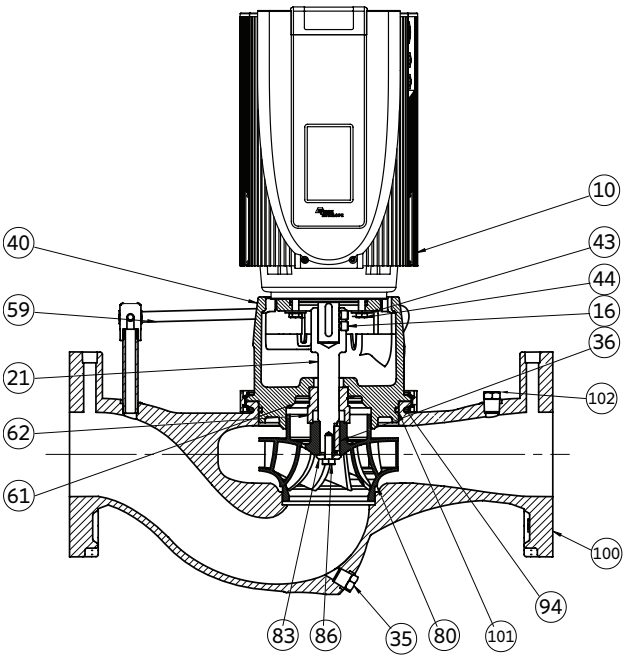
CAUTION

Always disconnect power supply from motor before beginning service work.

WARNING

Hydronic system components may be pressurized which, if suddenly released, can cause serious injury or death. When performing any kind of service to the pump, the pressure must be released in the system and the unit should be properly drained before starting any service work.

MECHANICAL SEAL REPLACEMENT INSTRUCTIONS FOR CLOSE-COUPLED PUMPING UNITS (SERIES 4380, 4372 & 4280)



The close-coupled or motor mounted type Vertical In-Line pumps use vertical shaft-down ball bearing motors (integrated motors and drives). Each pump and motor unit is pipe mounted and as such relies on the piping only for support. The piping support is designed for the weight of the piping, liquid, pump and motor and other pipe fittings. The pumping unit should not be independently secured to the building structure. If the pump is mounted separately to any structure, the pump must be isolated from the piping with flexible piping connections. For units with larger motors it is advisable to install a permanent device for lifting the rotating assembly out of the pipe mounted casing to service the unit.

Breakdown procedures:

CAUTION

Exercise extreme care when handling power wiring. Ensure that the fuses are removed or breaker disconnected in the power line to the motor. Power disconnect should be within sight of the pump being serviced and tagged with the reason for disconnection.

A Electrical wiring

If the pump and/or motor assembly is to be serviced on a bench, the motor wiring must be disconnected.

B Isolation valves

If the system is not drained: Ensure that the suction and discharge piping isolation valves are closed. Remove drain plug (35) from the bottom of the casing and drain the pump.

C Prepare assembly for removal

Secure the motor (10) by lifting straps to an overhead chain fall or similar lifting device. The device must be designed to lift the weight of the unit safely. Raise the lifter to bring the lifting straps taut. Disconnect the flush/vent flex hose from pump suction and secure flex hose to one side. Remove the clamp ring between casing (100) and adapter (40). Care should be taken not to apply pressure to the outside diameter of the adapter, to prevent possible breakage, outside pressure should be on the casing only.

D Remove rotating assembly

The rotating assembly [motor, adapter and impeller] (10, 40 & 80) may now be lifted out of the casing.

E Rotating assembly notes

The impeller (80) is fastened directly to the stub shaft and must be removed to replace the mechanical seal assembly (61/62). This may be accomplished on a safe surface near the installation, or more conveniently on a work bench.

F Impeller cap screw

The impeller (80) should be prevented from rotating while the impeller cap screw (86) is loosened. A heavy screwdriver or pry bar may be inserted in between the impeller blades to enable the impeller cap screw (86) to be backed off with a socket wrench [**NOTE:** be careful not to damage the impeller blades]. Remove the impeller cap screw and washer (86 & 83).

G Pump impeller

Using wheel pullers, with the jaws behind the rear shroud of the impeller (80) [Behind a vane at each side] pull the impeller free of the pump shaft. Impeller that is difficult to remove may be loosened by heating the impeller hub with a torch during the pulling process to remove the impeller from the motor shaft.

H Remove mechanical seal from motor shaft

The mechanical seal spring usually comes free with the impeller. The mechanical seal rotating element [seal head] (62) must be pried loose with pry bars or screwdrivers, placed under each side of the seal drive band. Leverage is applied against the adapter. Once loosened, the seal may be pulled free of the shaft.

Do not damage the carbon face when removing the rotating element [seal head]. It may be needed for analysis if seal failure investigation is required.

I Remove seal seat from adapter

The stationary seat (61) typically O-ring or L-cup mounted Silicon Carbide material, is pried loose from the recess in the adapter. If the seat cannot be removed in this manner, remove the motor cap screws and washers [lock washers] (43,44) and separate the adapter (40) from the motor (10). A screwdriver may then be used to push the seat out of the adapter from the rear.

J Remove old casing gasket

The former adapter O-ring should be scraped from the adapter, leaving clean surfaces [groove] for the new O-ring. [A standard putty knife and wire brush are useful for this purpose].

K Assembly Procedures:

Replace mechanical seal

- Clean the shaft stub (21) surface, ensuring all the former seal elastomer pieces have been removed. Inspect for damage. Replace if necessary.
- Install a new stationary seat (61) in the adapter cavity, being sure the lapped (polished) side of the insert is facing up. Ensure that the cavity has been thoroughly cleaned. Lubricate the stationary seat O-ring or L-cup with a small amount silicon or glycerine lubricant and firmly press down straight and even into the adapter cavity. Do not press the seat in with bare fingers or hammer it down, use a clean cloth or the cardboard disc typically supplied with the seal packaging. Contamination of the polished and lapped stationary seat face could cause leakage. If the adapter was removed from the motor, taking care that the stationary seat is carefully guided over the stub shaft when assemble the adapter back onto the motor.
- Lubricate the inside of the rotating seal [seal head] (62) with a small amount of silicon or glycerine lubricant and slide onto the stub shaft (21) with a twisting motion, carbon face first, until the carbon face is pressed firmly against the stationary seat (61). Firmly press on the rotating seal [seal head] metal parts with a screw driver all the way around the seal which will ensure that the faces are mated properly. Remove the spring retainer from the seal spring and place the seal spring over the rotating seal.

L Replace pump impeller

- Install the impeller key on the shaft and place the seal spring retainer onto the impeller hub register. Slide the impeller in place on the stub shaft.
- Take care and ensure that the seal spring is kept in place on the seal rotating assembly and fits well into the retainer on the impeller hub.

M Tighten impeller cap screw

It is good practice to replace self locking screws, once removed. Install the impeller cap screw and washer (83 & 86). Hold the impeller the same way as when the cap screw was successfully loosened (pry bar or screw driver placed carefully between the impeller blades) and tighten the cap screw with a socket wrench.

P Install new adapter O-ring

Insert new adapter O-ring into the O-ring groove of the adapter and apply silicon or glycerine lubricant around the O-ring.

Q Clamp Ring

Insert Clamp Ring thru the impeller and adapter flange. Tighten the nut on the clamp ring to 90-100 lbs-in.

R Lower rotating assembly into place

The rotating assembly motor, adapter and impeller combination may now be lowered into the casing.

S Casing and adapter clamp-ring

The casing and adapter clamp-ring is now installed and tightened with a wrench.

Reconnect the flush/vent flex hose assembly [check for damage and replace if necessary].

T Isolation valves

Replace the casing drain plug and open the suction and discharge isolation valves.

Motor wiring

- The motor conduit and its wiring are now replaced. If the motor is new, double check that the voltage and rpm are identical to the original motor.
- Be sure to check rotation of the motor after rewiring if the motor is three phase and correct if necessary, by switching any two lead wires.
- Ensure that the pump is filled with water before operating to check rotation.

U Conduit Box Cover

The conduit box cover is replaced after checking the motor rotation. The pump may now be placed in operation.

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